



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/561,926

12/22/2005

Akira Kurozuka

2005\_1641A

3215

52349 7590 07/21/2009  
WENDEROTH, LIND & PONACK L.L.P.  
1030 15th Street, N.W.  
Suite 400 East  
Washington, DC 20005-1503

EXAMINER

BIBBINS, LATANYA

ART UNIT

PAPER NUMBER

2627

MAIL DATE

DELIVERY MODE

07/21/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/561,926	<b>Applicant(s)</b> KUROZUKA ET AL.	
	<b>Examiner</b> LaTanya Bibbins	<b>Art Unit</b> 2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 29-56 is/are pending in the application.
- 4a) Of the above claim(s) 33-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-32 and 38-42, 45, 52-55 is/are rejected.
- 7) ☒ Claim(s) 43,44,46-51 and 56 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Preliminary Amendment*

1. Receipt is acknowledged of the preliminary amendment filed on December 22, 2005. In the amendment, claims 1-28 were canceled and claims 29-56 were added. Currently claims 29-56 are pending.

### *Election/Restrictions*

2. Applicant's election of Species I (claims 29-32 and 38-56) in the reply filed on May 1, 2009 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election **without traverse** (MPEP § 818.03(a)).

3. Claims 33-37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without traverse** in the reply filed on May 1, 2009.

### *Priority*

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**6. Claims 29-32, 39, 40, 45 and 52-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Maruyama (JP 2003-067969).**

**Regarding claim 29**, Maruyama discloses a deformable mirror (element 409 of drawings 16 and 18), characterized by including: a reflection mirror having a reflection surface on which light is reflected (409a of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), at least part of which is made of a member having ferromagnetism (409e of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]); and a switching device that switches between a deformed state and a non-deformed state of the reflection mirror with a magnetic force (elements 428 and 413 of drawings 16 and 18 respectively and the discussion in paragraphs [0036]-[0039]), wherein the switching device includes a hard magnetic member and a magnetizing member that magnetizes and demagnetizes the hard magnetic member (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]).

**Regarding claim 30**, Maruyama discloses the deformable mirror according to claim 29, wherein: the reflection mirror is brought into the deformed state by attracting the member having ferromagnetism in the reflection mirror as the hard magnetic member is magnetized by the magnetizing member, and the reflection mirror is restored to the non- deformed state as the hard magnetic member is demagnetized by the magnetizing member (see the discussion in paragraphs [0017] and [0036]- [0039]).

**Regarding claim 31**, Maruyama discloses the deformable mirror according to claim 29, wherein: the magnetizing member includes a yoke, a magnetizing coil, and a sub-coil (see elements 423, 426 and 427 of drawings 16 and 18 and drawings 19-21).

**Regarding claim 32**, Maruyama discloses the deformable mirror according to claim 31, wherein: at least part of the sub-coil and the yoke is disposed on a back surface and a side portion of the reflection mirror (see drawings 16-21).

**Regarding claim 39**, Maruyama discloses the deformable mirror according to claim 29, wherein: the reflection mirror uses a plate material having ferromagnetism as a base member (409e of drawings 16 and 18 and the discussion in paragraph [0039]).

**Regarding claim 40**, Maruyama discloses the deformable mirror according to claim 31, wherein: the member having ferromagnetism together with the yoke forms part of a magnetic circuit (see drawings 16-21).

**Regarding claim 45**, Maruyama discloses the deformable mirror according to claim 29, wherein: the member having ferromagnetism is made of a hard magnetic material (see the discussion in paragraph [0039]).

**Regarding claim 52**, Maruyama discloses an optical head configured to concentrate light on an optical information recording medium (drawings 6 and 7), the optical head being characterized by comprising: an objective lens that concentrates light on the optical information recording medium (element 7 of drawings 6 and 7); an objective lens actuator that drives the objective lens (see the discussion in paragraphs [0002]-[0006]); and the deformable mirror disposed to reflect light emitted from a light source toward the objective lens (element 6 of drawings 6 and 7), the deformable mirror including: a reflection mirror having a reflection surface on which light is reflected (409a of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), at least part of which is made of a member having ferromagnetism (409e of drawings 16 and 18 and

Art Unit: 2627

the discussion in paragraphs [0036]-[0039]); and a switching device that switches between a deformed state and a non-deformed state of the reflection mirror with a magnetic force (elements 428 and 413 of drawings 16 and 18 respectively and the discussion in paragraphs [0036]-[0039]), wherein the switching device includes a hard magnetic member and a magnetizing member that magnetizes and demagnetizes the hard magnetic member (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]).

**Regarding claim 53,** Maruyama discloses the optical head according to claim 52, wherein: the deformable mirror is provided in a space below the objective lens actuator (see drawings 6-8).

**Regarding claim 54,** Maruyama discloses an optical recording and playback device that concentrates light on an optical recording and playback medium having two recording layers and performs at least one of recording information in and reading recorded information from the optical recording and playback medium, the optical recording and playback device being characterized by comprising: the optical head (drawings 6 and 7); and a feeding portion that supplies the optical head with power needed to switch the states of the reflection mirror (element 412 of drawing 18), the optical head configured to concentrate light on an optical recording and playback medium (see drawings 6 and 7 and the discussion in paragraphs [0002]-[0006]), the optical head including: an objective lens that concentrates light on the optical recording and playback medium (element 7 of drawings 6 and 7); an objective lens actuator that drives the objective lens (see the discussion in paragraphs [0002]-[0006]); and the

Art Unit: 2627

deformable mirror disposed to reflect light emitted from a light source toward the objective lens (element 6 of drawings 6 and 7), the deformable mirror including: a reflection mirror having a reflection surface on which light is reflected (409a of drawings 16 and 18 and the discussion in paragraphs [0036]-[0039]), at least part of which is made of a member having ferromagnetism (409e of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]); and a switching device that switches between a deformed state and a non-deformed state of the reflection mirror with a magnetic force (elements 428 and 413 of drawings 16 and 18 respectively and the discussion in paragraphs [0036]-[0039]), wherein the switching device includes a hard magnetic member and a magnetizing member that magnetizes and demagnetizes the hard magnetic member (elements 426 and 427 of drawings 16 and 18 and the discussion in paragraphs [0036]- [0039]).

**Regarding claim 55,** Maruyama discloses the optical recording and playback device according to claim 54, wherein: the deformable mirror uses the reflection mirror as a plane mirror when light is concentrated on a first recording layer farther from a light-incident surface, and deforms the reflection mirror to be a concave mirror with the reflection surface forming a concave surface when light is concentrated on a second recording layer closer to the light-incident surface (see the discussion in paragraphs [0017] and [0036]- [0039]).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 38, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama (JP 2003-067969) in view of Nishioka et al. (US PGPub Number 2006/0187563 A1).**

Regarding claim 38, Maruyama discloses the deformable mirror according to claim 29 as noted in the 35 U.S.C. 102(b) rejection above. Maruyama, however fails to specifically disclose while Nishioka discloses wherein: the reflection mirror includes a base member comprising a glass plate (Figures 4 and 5 and the corresponding discussion in paragraphs [0180], [0193], [0194] and [0202]); and the member having ferromagnetism is provided to at least part of the base member (see Figure 5 and the discussion in paragraphs [0192]-[0195]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Nishioka into that of Maruyama. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings in order to provide a support means for the mirror body as suggested by Nishioka in paragraph [0180].

Regarding claim 41, the combination of Maruyama and Nishioka disclose the deformable mirror according to claim 38. Nishioka further discloses wherein: the

Art Unit: 2627

reflection surface comprises a reflection coating provided on a surface of the base member (see the discussion in paragraph [0180]).

**Regarding claim 42**, the combination of Maruyama and Nishioka disclose the deformable mirror according to claim 41. Nishioka further discloses wherein: the reflection coating comprises a dielectric multi-layer film (see the discussion in paragraph [0180]).

***Allowable Subject Matter***

**9. Claims 43, 44, 46-51 and 56** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Regarding claim 43**, none of the references of record, alone or in combination suggest or fairly teach a deformable mirror including all of the limitations of claim 41, wherein: **the reflection coating is provided on each of both surfaces of the base member**. Although the prior art discloses a reflection coating provided on one surface of the base member, the prior art fails to disclose that the reflection coating is provided on each of both surfaces of the base member.

**Regarding claim 44**, none of the references of record, alone or in combination suggest or fairly teach a deformable mirror including all of the limitations of claim 41, wherein: the reflection coating is provided on one surface of the base member; **and a counter coating, having a coefficient of thermal expansion same as a coefficient of thermal expansion of the reflection coating, is formed on the other surface of**

Art Unit: 2627

**the base member** in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

**Regarding claim 46-51**, none of the references of record, alone or in combination suggest or fairly teach a deformable mirror including all of the limitations of claim 29, further including: **a base; and a holding member supported on the base, wherein: the reflection mirror is held elastically by the holding member; and the switching device is incorporated into the base** in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

**Regarding claim 56**, none of the references of record, alone or in combination suggest or fairly teach an optical recording and playback device including all of the limitations of claim 54, wherein: **the feeding portion applies a pulse of voltage only when the states of the reflection mirror are switched** in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

### ***Conclusion***

**10.** Any inquiry concerning this communication or earlier communications from the examiner should be directed to LaTanya Bibbins whose telephone number is (571)270-1125. The examiner can normally be reached on Monday through Friday 7:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2627

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LaTanya Bibbins/  
Examiner, Art Unit 2627

/Thang V. Tran/  
Primary Examiner, Art Unit 2627